

REMARKS

I. Introduction

With the cancellation herein without prejudice of claim 26 and the addition of new claims 36 to 54, claims 15 to 25 and 27 to 54 are pending in the present application. In view of the foregoing amendments and the following remarks, it is respectfully submitted that all of the presently pending claims are allowable, and reconsideration is respectfully requested.

Applicants note with appreciation the acknowledgment of the claim for foreign priority and the indication that all of the copies of the certified copies of the priority documents have been received from the International Bureau.

Applicants thank the Examiner for considering the previously filed Information Disclosure Statement, PTO-1449 paper and cited references.

II. Allowable Subject Matter

Applicants note with appreciation the indication of allowable subject matter contained in claims 25 and 35.

The Examiner will note that claim 25 has been rewritten herein in independent form to include all of the limitations of its respective base claim and any intervening claims. It is therefore respectfully submitted that claim 25 is in condition for immediate allowance.

The Examiner will also note that new claims 36 to 54 have been added herein. It is respectfully submitted that claims 36 to 54 are fully supported by the present application, including the Specification, and that no new matter has been added. Claim 36 includes all of the features of claims 15 and 35 as originally filed, and claims 37 to 54 include features analogous to claims 16 to 24 and 26 to 34 as originally filed. It is therefore respectfully submitted that claims 36 to 54 are in condition for immediate allowance.

III. Objections to Claims 15 and 21

Claims 15 and 21 were objected to based on certain alleged informalities. Claim 15 has been amended herein without prejudice to delete "is modulated," and claim 21 has been amended herein without prejudice to change "mHz" to --MHz--. It is therefore respectfully submitted that the present objection

has been obviated, and withdrawal of this objection is therefore respectfully requested.

IV. Rejection of Claims 15 to 24 and 26 to 34 Under 35 U.S.C. § 102(b)

Claims 15, 17 to 24 and 26 to 34 were rejected under 35 U.S.C. § 102(b) as anticipated by Japanese Published Patent Application No. 09-232738 ("So et al."). Claims 15 to 17, 20 to 23, 28, 29 and 32 to 34 were rejected under 35 U.S.C. § 102(b) as anticipated by Japanese Published Patent Application No. 06-342770 ("Yoshie et al."). Applicants respectfully submit that neither So et al. nor Yoshie et al. anticipates the present claims as amended herein for the following reasons.

Claim 15 relates to a method for etching a pattern in an etching body in accordance with a plasma, in which a high-frequency-pulsed high-frequency power is coupled into the etching body, via an at least temporarily applied high-frequency a.c. voltage, and modulated at low frequency. Claim 15 has been amended herein without prejudice to recite that a mark-to-space ratio of the coupled, high-frequency-pulsed high-frequency power is between 1:2 and 1:100. Support for this amendment may be found, for example, on page 10, lines 34 to 37 of the Specification.

So et al. and Yoshie et al. relate to so-called diode reactors, i.e., parallel plate reactors, where **one** electrode, that is, the substrate electrode on which the wafer lies, is supplied with high frequency to generate both the plasma and the ion-acceleration voltage simultaneously. In this regard, So et al. and Yoshie et al. pursue a pulse strategy of attempting to increase the maximum ion-acceleration voltage without excessively reducing the average plasma density. Accordingly, the processes disclosed in So et al. and Yoshie et al. require high mark-to-space ratios of greater than 1:1, such as, for example, ratios corresponding to a duty cycle of 50%, 67%, or 80%. Indeed, as the pause time is increased, the efficiency of the processes disclosed in So et al. and Yoshie et al. suffer, despite an attempted increase in pulse density during the pulse phase via the increased ion-acceleration voltage, since plasma is not produced during the pause times. Hence, the processes disclosed by So et al. and Yoshie et al. rely on a high sputtering effect, that is, the incidence of ions on the wafer having as large a physical effect as

possible, such as may be used for oxide coatings, or they rely on higher anisotropy of the etching where the process is markedly induced by ions.

In stark contrast thereto, the subject matter of the claims of the present application relate to a high-density plasma system, in which the plasma generation (via an inductive plasma source) and the ion acceleration (via the high-frequency power applied to the substrate electrode) towards the wafer occur separately from each other and independently. In the plasma, the inductive source produces, *inter alia*, ions, which are accelerated in the direction of the wafer to a desired energy by the high frequency electrode. Hence, unlike So et al. and Yoshie et al., the present application involves a notch-resistant pulse technique to suppress the formation of pockets in response to stopping the etching on dielectric interfaces, whereby the process window is configured to be maintained as wide as possible for the actual silicon etching. Accordingly, the claims of the present application as compared to So et al. and Yoshie et al. are directed to entirely different subject matter.

To anticipate a claim, each and every element as set forth in the claim must be found in a single prior art reference. Verdegaal Bros. v. Union Oil Co. of Calif., 814 F.2d 628, 631, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987). Furthermore, “[t]he identical invention must be shown in as complete detail as is contained in the . . . claim.” Richardson v. Suzuki Motor Co., 868 F.2d 1226, 1236, 9 U.S.P.Q.2d 1913, 1920 (Fed. Cir. 1989). That is, the prior art must describe the elements arranged as required by the claims. In re Bond, 910 F.2d 831, 15 U.S.P.Q.2d 1566 (Fed. Cir. 1990). As more fully set forth above, it is respectfully submitted that So et al. and Yoshie et al. do not describe, or even suggest, a method of etching a pattern in an etching body, in which a mark-to-space ratio of a high-frequency-pulsed high-frequency power coupled into the etching body is between 1:2 and 1:100. It is therefore respectfully submitted that neither So et al. nor Yoshie et al. anticipates claim 15.

As regards claims 16 to 25 and 27 to 34, which ultimately depend from claim 15 and therefore include all of the limitation of claim 15, it is respectfully submitted that neither So et al. nor Yoshie et al. anticipates these dependent claims for at least the same reasons given above in support of the patentability of claim 15.

In summary, it is respectfully submitted that neither So et al. nor Yoshie et al. anticipates claims 15 to 25 and 27 to 34. Withdrawal of this rejection is therefore respectfully requested.

V. Conclusion

It is therefore respectfully submitted that all of the presently pending claims are allowable. All issues raised by the Examiner having been addressed, an early and favorable action on the merits is earnestly solicited.

Respectfully submitted,

KENYON & KENYON

Dated: December 1, 2003 By:


Richard L. Mayer
Reg. No. 22,490

R, No. 42,199

One Broadway
New York, New York 10004
(212) 425-7200

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